# Commonwealth of Kentucky FutureGen Proposal

## Summary

Kentucky is a magnificent place of natural beauty, inviting communities and industrious people. The unbridled spirit of our Commonwealth is renowned. Kentucky has much to offer. From the Eastern and Western Coal Fields, to the Lake Lands, to the lush hills of the Bluegrass Region, there are countless reasons to visit, live and work in the Commonwealth. Our natural resources and friendly citizens provide a quality of life that is matchless. Kentuckians take pride in their rolling landscapes, historic small towns, visual and performing arts, history and cultural heritage, lakes, caves, world-class dining and shopping, horse and auto racing and college athletics.

Kentucky is the nation's third largest coal producing state producing 119 million short tons in 2005 and containing 1.1 billion tons of recoverable coal reserves at active mine sites. Kentucky has two distinct coal fields, each containing numerous deposits of bituminous coal of various characteristics and mines of every type and size. Kentucky's coal industry employs over 15,000 people at an average wage of $47,000 per year.

Over ninety percent of Kentucky's electricity is generated from coal. This fact has proven to be significant for the Commonwealth in that Kentucky enjoys some of the lowest rates of electricity in the nation. The viability of coal as a clean energy resource is vital to Kentucky and to the nation to preserve low-cost electricity.

Kentucky is also a leader in the deployment of advanced clean coal technology. When releasing Kentucky's comprehensive energy strategy, Governor Fletcher stated, "Kentucky is open for the clean coal business." Since 2004, over $2.1 billion in base load, clean coal generation has been announced in the Commonwealth.

There is universal support from the various levels of political leadership for the FutureGen project to be sited in Kentucky. Statements of support include:

- ***Governor Ernie Fletcher:*** "Kentucky's proposal offers a tremendous set of attributes that would provide the Alliance with an excellent location to construct the FutureGen project."
- ***U.S. Senator Mitch McConnell:*** "I hope that you will realize the importance of this initiative to Kentucky and to the nation and give appropriate consideration to this application."
- ***Congressman Ed Whitfield:*** "I am aware that several states will submit proposed FutureGen sites. I am confident that none will offer a better combination of site characteristics, abundant coal reserves, research capabilities, experience in clean coal technology and support of its state government leaders and Congressional delegation.
- ***U.S. Senator Jim Bunning:*** "I support Kentucky's proposal and believe it will allow the FutureGen project to move forward with the full backing of the people, government and industry of Kentucky."

Given the state's business climate, its heritage and history as a coal producing state, its commitment to coal fueled generation as a low cost energy provider, its status

as a leader in the deployment of clean coal technology and the overwhelming political support for the project, Kentucky is well positioned to be the home of FutureGen.

## Kentucky's Financial Commitment to FutureGen

The Kentucky Office of Energy Policy is currently managing the Commonwealth of Kentucky's efforts to attract the FutureGen project. The recently enacted state budget allocated $7 million to the Kentucky Office of Energy Policy over the next biennium for energy research and development "which shall be used for research projects relating to clean coal, new combustion technology...and the development of alternative transportation fuels produced by processes that convert coal." The FutureGen project clearly meets these criteria.

Therefore it is the intention of the Commonwealth of Kentucky to utilize a portion of these resources to advance the FutureGen project's objectives and put forth the following financial commitments:

- Per the requirement of Section 1.5.7, the Kentucky Office of Energy Policy will provide up to $200,000 to prepare an Environmental Information Volume should Kentucky's site be selected as a Candidate Site.
- The Kentucky Office of Energy Policy will provide up to $1 million for further site characterization should Kentucky's site be selected as a Candidate Site.
- The Kentucky Office of Energy Policy will purchase the proposed site acreage and sell the site to the FutureGen Industrial Alliance for $1 should Kentucky's site be selected as the Preferred Site.
- The Kentucky Office of Energy Policy will provide up to $500,000 to construct a barge loading/unloading facility should Kentucky's site be selected as the Preferred Site.
- The Kentucky Office of Energy Policy will provide up to $200,000 for the application fee for the Industrial Alliance to comply with Kentucky's regulatory framework for siting electric transmission facilities at the point that such a requirement becomes necessary.

## Attributes of the Proposed Site.

The approximately 215 acre site proposed by the Commonwealth of Kentucky as host for the FutureGen facility is located in Henderson County, Kentucky. Some of the defining characteristics of the Commonwealth's FutureGen facility include:

- An underlying geology that demonstrates great potential for carbon sequestration.
- A mine mouth site that provides ample coal production less than one mile away.
- A location on the Green River that provides a sufficient water supply for the project.
- A location near the Green River's confluence with the Ohio River, providing access to a strategic transportation corridor for construction materials and coal transport.
- Several interconnections for the electricity to be transported to the national grid.

- Accessible to two different natural gas pipeline systems.
- Zoned for heavy industrial development.
- Location adjacent to operating oil wells.
- Located between two four-lane parkways and accessible by improved local roads.

## Compliance with Required Criteria

Detailed, one-page responses to individual, numbered sections of the Request for Proposals are provided, consistent with RFP instructions. Each response is referenced as to source; where applicable, maps are included. Additional details are in the Appendix. Summary comments on key sections follow.

## Part 1. Power Plant Qualifying Criteria.

The proposed FutureGen Site complies with all criteria stated in the RFP. The site is free from risk of significant seismic events. It is above the 100-year floodplain. No hazardous or radioactive materials or wastes are present. The site is outside restricted air space and controlled air space. No known cultural or archeological resources are present. The site contains no threatened or endangered species or critical habitats. It is not adjacent to a public access area. The site is more than 115 km from the nearest Class I Visibility Area (Mammoth Cave National Park). It is adjacent to abundant, available water supplies from the Green River. Finally, the site is capable of receiving coal delivery by at least three transport modes.

## Part 2. Geologic Storage Qualifying Criteria.

The proposed FutureGen Site complies with all stated criteria. The site is not located in proximity to a U.S. or State border. It is not located near marine shorelines or lakes or other public access areas. The site is not located near sensitive features such as dams, water reservoirs, hazardous materials storage facilities or other sensitive features. The Kentucky Geological Survey determined that the site contains no known economically valuable mineral resources in or adjacent to target formations at depth. No known subsurface sources of potable water are present in and around the target formations. It is well-positioned above primary and secondary target formations (saline aquifers as well as an organic shale) for carbon sequestration. There are no known access restrictions to land above target formations. The primary target formation is the Knox Supergroup, at depths of approximately 7,400 feet below ground level. The Knox Supergroup across the region has well-developed porosity zones, capable of accepting 100 percent of injected carbon dioxide, without artificial stimulation. Multiple seals occur above the Knox, comprised of dense dolomite, and stratigraphically higher strata such as the Black River carbonates (up to 575 feet above the Knox), the Maquoketa Shale (up to 1,250 feet above the Knox) and the New Albany Shale (up to 2,890 feet above the Knox).

The Curdsville Fault, which is not active seismically, is inferred beneath the alluvium just southeast of the Site and has been interpreted on two of the reflection seismic profiles in the study area. Oil fields are present on both sides of the fault, but no seeps

are known along the fault trace, suggesting that the fault is sealed and not transmissive over geologic time.

## Part 3. Power Plant Scoring Criteria.

The proposed FutureGen Site complies with all site criteria. The site comprises of approximately 215 acres. The terrain is a reclaimed surface coal mine and is gently rolling topography. Adjacent to the site are additional lands of up to 16,000 acres that may be available for lease or purchase. FEMA maps show that the site does not pose undue risk from hurricanes or tornadoes. As noted previously, the proposed site has been altered due to surface coal mining. The elevation at the site and the ground slope are advantageous to facility development, and the site is protected from the 100-year flood by a levee which was constructed as part of the reclamation effort. Wetlands areas are minimal at the proposed site and along various corridors projected for transmission lines and transportation routes. Road access to the site is more than adequate and river access to the site assures that roads in the vicinity will not be the only transportation alternative.

Site characteristics are very favorable and take advantage of the unique nature of the chosen area. All of the $CO_2$ injection wells within the plume area will be accessible at the surface. The site itself is zoned for Heavy Industrial usage; does not contain any adverse characteristics in the form of sensitive areas or critical habitat; and is adjacent to a readily available source of fuel. The proposed site offers several options for interconnection to the electrical grid and for access to nearby natural gas pipelines. The proposed area has excellent human resources as well. Population centers in the region can provide the necessary workforce for the proposed plant, and the City Cost Index for the nearest town is well below the U.S. 30-city average. In addition, Kentucky's workforce is more productive than the U.S. average, and Kentucky has received national recognition for its workforce training programs.

Necessary permits for the FutureGen facility will be accomplished through an efficient state regulatory mechanism that has vast experience with natural resource and environmental issues. The air permit will be administered by the state's Division for Air Quality which has experience with two other air permits for gasification facilities including to the immediately adjacent proposed IGCC facility. Water withdrawal requirements for the FutureGen plant represent a minor allocation for the Green River even during low flow conditions.

## Part 4. Geologic Storage Scoring Criteria.

The proposed FutureGen Site complies with the stated criteria. The primary injection target for the FutureGen site is the Knox Supergroup. It can contain 100 percent of the projected $CO_2$ plume. The Knox is a regionally thick and extensive dolomite with well-developed porosity zones. Kentucky has also identified several alternative injection targets to demonstrate the proposed site's ability to sequester $CO_2$ as a supercritical fluid in fractures, dissolved in water filling the fractures, or adsorbed primarily on the dispersed organic matter in a shale matrix. Research on each of these alternative storage states at this site can be valuable in the selection of future sites. Kentucky's vast experience with coal mining and oil and gas production has put into place an orderly process

to allow access to surface and subsurface areas for monitoring, mitigation and verification activities.

## Part 5. Best Value Assessment

The proposed site location chosen by Kentucky provides the best value to the FutureGen Alliance and the consumers of the various products produced by the project. The proposed site is one that achieves the overall objective of cost-efficient production of electricity and hydrogen from diverse coal types and offers enhanced economic benefits.

When the proposed project is evaluated in terms of the best value criteria, it is apparent that Kentucky's submittal will provide the best combination of cost effective production and unique economic benefits, a number of which are highlighted below:

- Kentucky's FutureGen site will be purchased by the Commonwealth of Kentucky and "donated" to the FutureGen Alliance if Kentucky is selected as the Preferred Site.
- The Kentucky Office of Energy Policy will provide up to $1 million for further site characterization should Kentucky's site make the Candidate Site list.
- The Kentucky Office of Energy Policy will provide up to $200,000 to prepare an Environmental Information Volume should Kentucky's site make the Candidate Site list.
- The Kentucky Office of Energy Policy will provide up to $200,000 for the application fee for the Industrial Alliance to comply with Kentucky's regulatory framework for siting electric transmission facilities should Kentucky's site be selected as the Preferred Site.
- The Kentucky Office of Energy Policy will provide up to $500,000 to construct a barge loading/unloading facility should Kentucky's site be selected as the Preferred Site.
- The Commonwealth of Kentucky will appoint a "permitting liaison" for the FutureGen project to ensure the state permitting process is coordinated and expedited to the greatest extent possible.
- The site provides potential for enhanced oil recovery of 40 million barrels of crude oil within 25 miles of the site and potentially 450 million barrels within 110 miles of the site.
- The proposed site potentially allows flexible operating characteristics including shared facilities for waste disposal, barge loading and unloading facilities, sediment ponds, water withdrawal, and air pollution control by virtue of its location adjacent to a property being developed for a merchant electricity generating station.
- Kentucky has a substantial energy research base within its universities, and the Kentucky Office of Energy Policy will be managing $7 million in research and development funds over the next two years.
- Utility wastes such as those proposed to be generated by the FutureGen facility are classified as special waste under Kentucky regulations and may be beneficially reused or permitted for special waste landfills.

## MultiState Collaboration

The Commonwealth of Kentucky, the Commonwealth of Pennsylvania and the State of Ohio have entered into a Memorandum of Understanding (MOU) to memorialize a collaborative relationship amongst its member states. The MOU permits any member state the option of submitting a response to the FutureGen site solicitation. It then states:

> *Should a Member State's proposal not be selected by the FutureGen Industrial Alliance to advance through the several stages of the site evaluation process, as defined in the Alliance's Final Request for Proposals, that Member State agrees to support proposal(s) from other Member States that survive the screening process and are included in the "Candidate Site List" to be submitted by the Alliance to the U.S. Department of Energy.*

Given that the FutureGen Alliance is likely to consider a range of possible sites, it is recognized that multiple sites from the member states could make it to the "Candidate Site List." Therefore, the competition for selection for the Preferred Site would continue.

Ultimately, though, the members of this MOU agree that a site within a member state is preferable and will be supported by the MOU's signatories.

Further, the signatories of this MOU have organized the Ohio River Valley Coal Research Consortium. The signatories believe that there is significant research capacity within the universities of the member states that could be a tremendous asset to the FutureGen Alliance.

Membership of this Consortium includes the University of Kentucky, Penn State, University of Pittsburgh, Ohio State, Ohio University, University of Cincinnati, University of Akron, Case Western Reserve, University of Dayton and Carnegie Mellon.

Other member institutions may also be solicited to join.

## Comment on Contractual Terms and Conditions

In anticipation of entering into a contract with the FutureGen Alliance, The Commonwealth of Kentucky agrees to the acceptance of the terms and conditions found in the Request for Proposal, specifically:

- The Commonwealth of Kentucky agrees to comply fully with all applicable federal, state and local laws, rules and regulations with respect to the transfer of the interest in the property, and the Commonwealth of Kentucky agrees that the FutureGen Industrial Alliance shall have exclusive use of the offered property for the term of the contract.
- The laws of the Commonwealth of Kentucky shall govern the Site Agreement.
- The Commonwealth of Kentucky accepts the language in the Request for Proposal regarding force majeure terms and conditions, relationship of the parties, separability clause, and conditions of the termination for the contract.
- The Commonwealth of Kentucky agrees that all prices and payments must be in U.S. dollars.
- The Commonwealth of Kentucky shall have valid title to the property in order to enter into a Site Agreement with the Alliance, and the Commonwealth of Kentucky shall warrant that the property will conform to the specifications in the RFP.

- Short of an amendment to Kentucky's Constitution, the Commonwealth is prohibited from taking title to the $CO_2$ and/or indemnifying the Industrial Alliance for any potential liability associated with the $CO_2$ and/or the sequestration thereof.

## Conclusion

The Commonwealth of Kentucky applauds President Bush, the U.S. Department of Energy, and the FutureGen Industrial Alliance for putting forth the FutureGen vision. Kentucky's proposal offers a tremendous set of attributes that would provide the Alliance with an excellent location to construct the facility. Kentucky welcomes the opportunity to compete for the FutureGen project and looks forward to working with the Site Selection team.

We believe that Kentucky's proposal satisfies or exceeds specific requests for information contained in the Alliance's Final Request for Proposals. We are prepared to respond promptly to questions regarding this proposal, and to welcome representatives of the FutureGen Industrial Alliance to Kentucky for discussions and visits to the proposed site. Questions should be addressed to Andrew V. McNeill, Acting Executive Director, Kentucky Office of Energy Policy, at telephone number (502) 564-4270, or via e-mail at andrewv.mcneill@ky.gov or Talina Mathews, FutureGen project director, at telephone number 502-564-7192 or via e-mail at talina.mathews@ky.gov .